

THE UNIVERSITY OF CHICAGO

THE INTERRELATIONSHIP OF ACHIEVEMENT TEST SCORES,
COURSE GRADES, AND STATE BOARD EXAMINATION SCORES

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CHAPTER I

INTRODUCTION

In perceiving the appropriate place of evaluation in modern education, consideration must be given to the purposes which a program of evaluation may serve. These purposes of evaluation include: to make a periodic check on the effectiveness of the educational institution; to validate the hypothesis upon which the educational institution operates; to provide information basic to effective guidance of individual students; to provide a certain psychological security to the school staff, to the students, and to the parents; and to provide a sound basis for public relations.¹

The problems in the evaluation of student progress are the same no matter the level of education; they are, namely, what should we evaluate, when should we evaluate, how should we evaluate, and for what purposes should we evaluate?

The need for schools of nursing to evaluate the progress and achievement of nursing students is implicit in the twofold responsibility which every school recognizes--responsibility to the public for the competence of its graduates and responsibility

¹Eugene R. Smith, Ralph W. Tyler and the Evaluation Staff, Appraising and Recording Student Progress (New York: Harper and Brothers, 1942), pp. 7-11.

to the students for providing them with opportunities to prepare for nursing.¹

Nursing instructors in every subject area are constantly confronted with the task of evaluating their teaching. In determining the effectiveness of their teaching, they ask themselves:

Are the objectives of the course being met? Are the students receiving the sort of information that will be most helpful to them? How could their experience be enriched? In what ways could the course content be presented to make it more meaningful? How can we be sure the curriculum is flexible enough to meet each student's needs? Are the desired changes in the student's behavior taking place?²

Evaluation of student progress and achievement is a problem of major concern in nursing schools today. We know that nursing school programs are not set up for the purpose of sending students from one instructor to the next to accumulate areas of knowledge. The purpose of a nursing school program is that of any other educational institution, that is:

. . . to teach students so that they will develop understanding or skill in some field or fields. If we cannot evaluate the performance of this function in any way, it is obvious that there is no justification for spending public or private funds for teachers' salaries. If we do not know whether the teaching is effective, it's like spending money for buildings without checking to see whether they were ever built.³

¹The Use of Tests in Schools of Nursing: The NLN Achievement Tests in Professional Nursing (No. 2; New York: The National League for Nursing, 1954), p. 1.

²Margaret L. Jones, "How Effective is My Teaching?" American Journal of Nursing, LI (February, 1951), 135.

³Edwin Guthrie, "The Evaluation of Teaching," American Journal of Nursing, LIII (February, 1953), 220.

There is all too often a tendency in some nursing schools to wait to see how their product turns out, and then determine whether they have accomplished their mission. It is extremely difficult, though, to evaluate the functioning of a professional nurse.

There are, however, a number of interim measures of success which are available, such as course grades, successful completion of the course, and scores on the licensing examination--all of these steps are necessary before a nursing student can become a registered nurse. Therefore, the relationship between test scores and each of these measures has significance, and it is valuable to determine them.¹

This last statement is the premise on which this study operates, that the interrelationship of achievement test scores, course grades, and state board examination scores has significance.

The study is also based on the recognition of the limitation of any single evaluation tool; or, conversely, the recognition of the need to use a variety of evaluation tools, based on the specific nature of what is being measured.

Course grades have often been belittled as indicating only how well the student has mastered the material that the instructor feels is important. The course grade has been called an evaluation of the instructor's teaching. The course grade does not tell us how good a nurse the student is or may be, or in more expressive terms: "In general, conventional course grades suffer from the limitation of not being analytic; they do not

¹Evaluation and Guidance Service of the National League for Nursing, "The Comprehensive Record System," Nursing Outlook, I (March, 1953), 158.

analyze achievement into component parts."¹

An extremely different view of course grades is expressed in a recent publication:

The importance of such teacher-made tools cannot be over-emphasized. They are essential for any evaluation of the student's progress in terms of the school's objectives, and the information obtained from them can have a significant effect on the total program of student guidance. . . . In fact, as a means of guiding the faculty in its efforts to improve the entire educational program, the potentialities of teacher-made evaluation devices are myriad.²

On the other hand, achievement tests³ are of greatest value:

. . . in evaluating a program, rather than in evaluating the students enrolled in that program. The test which the teacher devises must still be used to determine whether the students have learned what she presented to them, but the achievement test may be administered to see if these students have learned what the public expects nurses to know.⁴

Achievement tests, too, have limitations. For example, a student who receives a high score on an achievement test in obstetrics while she is in the basic program:

. . . does not necessarily have the complete knowledge and skill which is required to give total nursing care to obstetric patients. It simply means that she knows the

¹Edward J. Furst, "Criteria of Success in the School of Nursing," American Journal of Nursing, L (August, 1950), 496.

²The Use of Tests in Schools of Nursing: The NLN Achievement Tests in Professional Nursing, p. 3.

³The term achievement test, as used in this study, refers to the National League for Nursing Achievement Tests in Professional Nursing.

⁴Mildred Katzell, "The NLN's Test Service," American Journal of Nursing, LVI (January, 1956), 60.

answers to more of the questions than did anyone else in the group on which the test standards were established.¹

Yet, the well-constructed national achievement tests provide a school with valuable information. They show how the achievement of a student in the school compares with that of students throughout the country. It must be remembered, however, that if a student earns low grades on achievement tests, it does not necessarily mean that the ability and skill of the student are inferior. It may simply reflect the fact that the curriculum of the school varies widely from that of the typical school.²

Probably the evaluating devise in which nursing schools place the most faith is the state board examination.³ "In no other profession is it possible to compare the performance of a candidate in any jurisdiction with that of all candidates in all other jurisdictions throughout the country."⁴

Many nursing educators have come to believe that the results of the licensing examinations are the most valid evaluation of the individual student's abilities, and of the success of the

¹Department of Measurement and Guidance of the National League of Nursing Education, "What's in a Test Score?" American Journal of Nursing, LI (June, 1951), 409.

²Ruth Bishop, "Testing the Product," Annual Report of the National League of Nursing Education (New York: Livingston Press, 1951), p. 222.

³The term state board examination, as used in this study, refers to the State Board Test Pool Examinations which are prepared by the National League for Nursing Test Construction Unit for the state boards of nursing.

⁴Department of Measurement and Guidance of the National League of Nursing Education, "The State Board Test Pool Examination," American Journal of Nursing, LII (May, 1952), 615.

nursing school's program. There is no doubt that the licensing examinations are comprehensive:

Each test includes questions designed to evaluate the candidate's understanding of the principles of the physical, biological, and social sciences which are considered important for learning experiences in the various clinical areas, as well as questions designed to test the candidate's nursing skills and abilities in a given area. A real effort has been made to develop most of the test questions around nursing care in given situations. The questions are designed to test the candidate's ability to relate and evaluate information which he or she has gained through classroom and clinical experience. Thus, in order to answer a question on the test in nursing of children, she may be required to correlate and apply what she has learned in anatomy and physiology, microbiology, pharmacology, nutrition, normal growth and development, and nursing arts, as well as pediatric nursing.¹

Evaluation is a continuous, not a static, process; it is best expressed in terms of measurement toward a goal, not in terms of the achieved goal. Since achievement test scores, course grades, and state board examination scores are common to the majority of nursing schools, it seems logical to study the interrelationship of these guide posts along the road toward maximum growth and development.

Statement of the Purpose

The purpose of this study is to determine the interrelationship of achievement test scores, course grades, and state board examination scores in a selected school of nursing.

In the selected school, the performance of the students on the achievement tests has been a major problem. The students successfully complete the individual courses and successfully pass

¹Ibid., p. 614.

the licensing examinations (the school has not had a student fail to pass the licensing examination for seven years). Yet, a number of Senior students consistently fail to pass the achievement tests given at the beginning of the third year. The policy in the school has been that the students must make scores in or above the 40th percentile on the achievement tests in order to be graduated from the school. The students have been permitted to repeat the tests, and then achieve an acceptable score.

It is well to admit that "factors such as motivation, interest, and perseverance, which are not directly measured by a test, play an important part in achievement."¹ However, this study does not attempt to analyze these aspects of achievement.

The Selected School of Nursing

The selected school of nursing which is located in a mid-western city, was established in 1900. It offered a two-year program in nursing until 1905, when the term was changed to three years. The usual enrollment in the school is approximately 125. The school is approved by the State Nurses' Board and received temporary accreditation from the National Nursing Accrediting Service in 1952.

The hospital, of which the school has always been an integral part, was also founded in 1900. Its present size is 300 beds and it offers to students of nursing experience in the care of medical and surgical patients, obstetrics, operating room, and

¹Sister Madeleine Clemence, "Using Test Results," American Journal of Nursing, LI (March, 1951), 206.

diet therapy. Experience for the students in Pediatric, Psychiatric, and Tuberculosis nursing is provided by affiliation with other institutions.

All services in the hospital are non-segregated with the exception of Medicine, Obstetrics, and Eye, Ear, Nose, and Throat. The hospital is accredited and approved for internship and residency by the American Medical Association, the American College of Surgeons, and the American Hospital Association.

Sources of Data and Method of Procedure

The data used in this study were compiled from the records of all 98 individuals graduating from this school of nursing during 1953, 1954, and 1955. These three graduating classes were selected for analysis since all necessary data were available for these students. Complete data were not available for classes graduating before 1953.

Data collected for each of the 98 students included course grades in General Medical and Surgical Nursing, Obstetric Nursing, Pediatric Nursing, and Psychiatric Nursing; achievement test scores in Medical Nursing, Surgical Nursing, Obstetric Nursing, Nursing of Children, and Psychiatric Nursing; and state board examination scores in Medical Nursing, Surgical Nursing, Obstetric Nursing, Nursing of Children, and Psychiatric Nursing.

A course grade in the selected school refers to the average derived from the daily grades, tests, written assignments, mid-term examination, and final examination in a specific course. The course grade does not include an evaluation of clinical prac-

tice. Course grade honor point values were used for correlation purposes.

Some difficulty was encountered in deciding upon the course grade to be used for correlation purposes in the Medical Nursing and Surgical Nursing areas. In this school, Medical and Surgical Nursing is divided into three classifications: (1) General Medical and Surgical Nursing; (2) Medical Specialties; and (3) Surgical Specialties. The problem was, should all these various grades in Medical and Surgical Nursing be averaged, with proper weighting, and the derived grade used for correlation purposes? On the other hand, would the single grade in General Medical and Surgical Nursing be better for determining relationships?

It was decided that the use of the General Medical and Surgical grade would be more meaningful and would follow the same general pattern of the other variables used in correlation. Also, from the practical point of view, a school would be interested in the relationship of a course grade not in the average of a group of course grades. This decision was supported by correspondence with Mrs. Mary Shields, Director of the National League for Nursing Test Construction Unit, and by material in the League's pamphlet on achievement tests.¹

A battery of twelve achievement tests is administered during the first quarter of the senior year in the selected school.

¹The Use of Tests in Schools of Nursing: The NLN Achievement Tests in Professional Nursing, pp. 6-12.

These achievement tests include: Anatomy and Physiology; Chemistry; Microbiology; Nutrition and Diet Therapy; Pharmacology and Therapeutics; Fundamentals of Nursing; Medical Nursing; Surgical Nursing; Obstetric Nursing; Nursing of Children; Communicable Disease Nursing; and Psychiatric Nursing.

Five of these twelve achievement tests were chosen for study, since these five tests corresponded in subject area with the five state board examinations. It would therefore be possible to secure a more meaningful picture of interrelationships.

The relationship of achievement test scores, course grades, and state board examination scores was determined by computing coefficients of correlation using a common formula for ungrouped data.¹

Treatment of the data is presented in the following chapters. An example of the calculation of the coefficient of correlation is shown in the Appendix.

$$\text{Formula: } r = \frac{\sum xy}{\sqrt{\sum x^2} \cdot \sqrt{\sum y^2}}$$

CHAPTER II

THE RELATIONSHIP OF ACHIEVEMENT TEST SCORES AND COURSE GRADES

The purpose of this chapter is to present and analyze the relationship of achievement test scores and course grades of all students in three graduating classes in the selected school of nursing.

Coefficients of correlation for achievement test scores and course grades were calculated for the following five subject areas: Medical Nursing; Surgical Nursing; Obstetric Nursing; Pediatric Nursing; and Psychiatric Nursing.

The tables, which present the distributions of the ten variables in the five areas, were constructed with the same range, that is, with the same maximum and minimum scores and grades. This was done so that the various distributions might be more easily compared.

Medical Nursing

The distribution of achievement test scores and course grades in Medical Nursing is shown in Table 1. General Medical and Surgical Nursing course grades ranged from A through C, with B- as the group median. The Medical Nursing achievement test

scores ranged upward from the 20th percentile through the 99th percentile, with a mean score of 78.4

TABLE 1

GENERAL MEDICAL AND SURGICAL NURSING COURSE GRADES
DISTRIBUTED BY MEDICAL NURSING ACHIEVEMENT
TEST PERCENTILE SCORES

Achievement Test Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total	98	2	9	13	21	22	27	4	
95 through 99	16	1	7	4	1	2	1		
90 through 94	15	1	1	2	4	4	3		
85 through 89	19		1	3	7	5	2	1	
80 through 84	8			1	3	2	2		
75 through 79	7			3	1	1	2		
70 through 74	7				3	4			
65 through 69	3				2		1		
60 through 64	7					1	7		
55 through 59	3					2	2		
50 through 54	7					2	3	2	
45 through 49	1						1		
40 through 44	1						1		
35 through 39	1						1		
30 through 34	1						1		
25 through 29									
20 through 24	2					1	1		
15 through 19									
10 through 14									
5 through 9									
0 through 4									

There were 4 students who failed to pass the Medical Nursing achievement test, making scores which fell below the 40th percentile. Of these 4 students, 3 had course grades of C+ and the other student had a course grade of B-. The coefficient of

correlation for achievement test scores and course grades in the Medical Nursing area was plus .59.

Surgical Nursing

Course grades in the Surgical Nursing area, Table 2, show the same range and median grade as for the Medical Nursing area, since the single grade in General Medical and Surgical Nursing was used for both correlations. Surgical Nursing achievement

TABLE 2

**GENERAL MEDICAL AND SURGICAL NURSING COURSE GRADES
DISTRIBUTED BY SURGICAL NURSING ACHIEVEMENT
TEST PERCENTILE SCORES**

test scores tended to be quite similar to Medical Nursing achievement test scores. The means for both distributions were remarkably similar, being 78.4 for Medical Nursing and 77.1 for Surgical Nursing.

There were 4 students who failed to make acceptable scores on the Surgical Nursing achievement test. Of these students, 2 had course grades of B- and 2 had course grades of C+.

General Medical and Surgical Nursing course grades and the Surgical Nursing achievement test scores showed a plus .57 coefficient of correlation.

Obstetric Nursing

The course grades in Obstetric Nursing, as illustrated in Table 3, tended to have a relatively narrow range. The lowest grade was C+ (received by 3 students), and the median grade was A-, with over 28 per cent of the students receiving a grade of A.

Achievement test percentiles in Obstetric Nursing ranged from the 5th through the 99th percentile, with a mean of 73.6. Students failing the Obstetric Nursing achievement test numbered 7. These 7 achievement test failures occurred for students who had received every Obstetric Nursing course grade except B-, that is, from A through C+ with the exception of B-.

The calculated coefficient of correlation for achievement test scores and course grades in Obstetric Nursing was plus .25.

TABLE 3

**OBSTETRIC NURSING COURSE GRADES DISTRIBUTED BY
OBSTETRIC NURSING ACHIEVEMENT TEST
PERCENTILE SCORES**

Achievement Test Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total	98	28	29	18	14	6	3		
95 through 99	15	5	6	3	1				
90 through 94	10	5	4	1					
85 through 89	12	3	4		3	2			
80 through 84	9	5	1	1	1	1			
75 through 79	7	1	2	2	1	1			
70 through 74	10	1	5	1	2		1		
65 through 69	9	3	1	4		1			
60 through 64	1			1					
55 through 59	2			1		1			
50 through 54	14	4	3	3	3		1		
45 through 49	2		1		1				
40 through 44									
35 through 39	3		1	1	1				
30 through 34	1				1				
25 through 29									
20 through 24	2		1				1		
15 through 19									
10 through 14									
5 through 9	1	1							
0 through 4									

Pediatric Nursing

Table 4 shows the distribution of achievement test scores and course grades in Pediatric Nursing. Course grades in Pediatric Nursing ranged from A through C with a median grade of B.

Achievement test scores in Pediatric Nursing ranged from the 15th through the 99th percentile with a mean of 78.1. The 6

Pediatric Nursing achievement test failures occurred for students whose Pediatric Nursing course grades had been A-, B+, B-, or C+.

Pediatric Nursing achievement test scores and course grades showed a coefficient of correlation of plus .38.

TABLE 4

PEDIATRIC NURSING COURSE GRADES DISTRIBUTED BY
PEDIATRIC NURSING ACHIEVEMENT TEST
PERCENTILE SCORES

Achievement Test Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total	98	2	9	19	28	19	14	7	
95 through 99	18	1	2	7	6	2			
90 through 94	18		3	3	8	3	1		
85 through 89	11	1	2	1	1	2	4		
80 through 84	9			1	3	2	2	1	1
75 through 79	9			1	2	3	1	2	
70 through 74	9			1	3	3	1	1	
65 through 69	5				2	1	1	1	
60 through 64	5				1	2		2	1
55 through 59	1								
50 through 54	5					1	2	2	
45 through 49									
40 through 44	2					2			
35 through 39	1							1	
30 through 34	1					1			
25 through 29	1						1		
20 through 24	2							1	
15 through 19	1							1	
10 through 14									
5 through 9									
0 through 4									

Psychiatric Nursing

The calculated coefficient of correlation for the Psychiatric Nursing achievement test scores and course grades was plus .34.

The course grades in Psychiatry, Table 5, showed the widest distribution of any of the 5 subject areas and ranged from A through C-, with a median grade of B.

TABLE 5

PSYCHIATRIC NURSING COURSE GRADES DISTRIBUTED BY
PSYCHIATRIC NURSING ACHIEVEMENT TEST
PERCENTILE SCORES

Achievement Test Scores	Course Grades									
	Number of Students in Each Interval									
	Total	A	A-	B+	B	B-	C+	C	C-	
Total	98	3	12	14	24	14	14	13	4	
95 through 99	18	3	1	4	6	1	2	1	2	
90 through 94	18	2	2	2	4	5	3	2	2	
85 through 89	10	1	3	3	3			3	3	
80 through 84	10	3	3	3	1	2	2	1	1	
75 through 79	7	1	1	1	2	1		1	1	
70 through 74	15	2	1	1	4	2	4	1	1	
65 through 69	3				1	1	1			
60 through 64	3	1				2				
55 through 59	6	1			1		2	1	1	
50 through 54	2				1			1		
45 through 49	1			1						
40 through 44	1			1						
35 through 39	2			1				1		
30 through 34										
25 through 29										
20 through 24	1								1	
15 through 19	1							1		
10 through 14										
5 through 9										
0 through 4										

The mean for the Psychiatric Nursing achievement test was 79.3 which was the highest achievement test average for any of the 5 subject areas. There were 4 students who placed lower than the 40th percentile in the Psychiatric Nursing achievement test. Of

these students, 1 had a Psychiatric Nursing course grade of B+, 1 student had C-, and 2 had C.

Summary

The coefficients of correlation for the five subject areas, Medical Nursing, Surgical Nursing, Obstetric Nursing, Pediatric Nursing, and Psychiatric Nursing ranged from a low of plus .25 in Obstetric Nursing to a high of plus .59 for Medical Nursing.

Achievement test failures occurred in all five subject areas, each area showing four or more failures. Achievement test means tended to be relatively close, ranging from 73.6 in Obstetric Nursing to 79.3 in Psychiatric Nursing.

The largest number of achievement test failures, 7, occurred in Obstetric Nursing, the subject area with the lowest coefficient of correlation. However, the number of failures in Obstetric Nursing was only slightly greater than the number of failures in other areas. No valid assumption can be made as to the reason for achievement test failures since they occurred in every subject area and showed no great tendency to decrease as the determined degree of correlation increased.

The purpose of this chapter has been to present and analyze the relationship of achievement test scores and course grades of all students in three graduating classes in the selected school.

In the following chapter discussion will concern the relationship of achievement test scores and state board examination scores for this same specified group of students.

CHAPTER III

THE RELATIONSHIP OF ACHIEVEMENT TEST SCORES AND STATE BOARD EXAMINATION SCORES

The preceding chapter's content was devoted to a discussion of the relationship of achievement test scores and course grades of all students in three graduating classes in the selected school of nursing. The purpose of this chapter is to present and analyze the relationship of achievement test scores and state board examination scores for this same group of students.

Coefficients of correlation were calculated for achievement test scores and state board examination scores in the five subject areas: Medical Nursing; Surgical Nursing; Obstetric Nursing; Pediatric Nursing; and Psychiatric Nursing.

The tables (6, 7, 8, 9 and 10), which present the distributions of the ten variables in the five subject areas, were constructed with the same range, that is, with the same maximum and minimum scores. This was done so that the various distributions might be more easily compared.

Distribution of scores and the mean score for each of the five achievement tests were discussed in the preceding chapter. Therefore, since these same achievement test scores were used to

determine relationships with both course grades and state board examination scores, it does not seem pertinent to repeat this information.

Medical Nursing

Table 6 shows the distribution of achievement test scores and state board examination scores in Medical Nursing. The main body of Medical Nursing state board examination scores ranged from 400 through 724, with 1 individual who made a score in the 775-799 class interval. The mean Medical Nursing state board examination score was 562.8.

The 4 individuals who failed to pass the Medical Nursing achievement test placed below 500 on the Medical Nursing state board examination. There were, however, 17 other students who placed below 500 on the Medical Nursing state board examination: all these 17 students had originally made passing scores on the Medical Nursing achievement test.

A plus .63 coefficient of correlation was determined for Medical Nursing achievement test scores and Medical Nursing state board examination scores.

Surgical Nursing

Surgical Nursing achievement test scores and state board examination scores, as shown in Table 7, showed a correlation coefficient of plus .52.

In reference to the Surgical Nursing state board examination scores, 1 individual placed in the 750-774 class interval,

TABLE 6
MEDICAL NURSING STATE BOARD EXAMINATION SCORES DISTRIBUTED BY MEDICAL NURSING ACHIEVEMENT TEST PERCENTILE SCORES

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TABLE 7

SURGICAL NURSING STATE BOARD EXAMINATION SCORES DISTRIBUTED BY SURGICAL NURSING ACHIEVEMENT TEST PERCENTILE SCORES

while the scores of the rest of the group ranged from 375 through 699. The Surgical Nursing state board examination mean, 556.3, was 6.5 points below the Medical Nursing state board examination mean.

Of the 4 students who failed to pass the Surgical Nursing achievement test, 3 placed below 500 on the Surgical Nursing state board examination while the other student placed in the 500-524 interval.

Obstetric Nursing

The striking feature of the Obstetric Nursing state board examination distribution (Table 8), is the narrow range of the scores with a clustering of the scores below 650. In the other 4 subject areas, there were from 7-12 students who made state board examination scores above this level. The Obstetric Nursing state board examination scores were distributed from 375 through 649 with a mean of 531.8, which was considerably lower than the means of the other 4 subject areas.

The 7 individuals who had previously failed to pass the Obstetric Nursing achievement test made a variety of Obstetric Nursing state board examination scores. Of these 7 individuals, 4 placed below the Obstetric Nursing state board examination mean, and 3 placed above this mean.

The calculated coefficient of correlation for Obstetric Nursing achievement test scores and state board examination scores was plus .42.

TABLE 8

**OBSTETRIC NURSING STATE BOARD EXAMINATION SCORES DISTRIBUTED BY
OBSTETRIC NURSING ACHIEVEMENT TEST PERCENTILE SCORES**

Pediatric Nursing

Pediatric Nursing state board examination scores, as illustrated in Table 9, covered a wide range. The main portion of the group placed between 425 and 724, with 1 student making a high score in the 775-799 interval, and 1 student making a low score in the 375-399 interval. The Pediatric Nursing state board examination mean was 568.7, the highest of any of the five state board examination means.

The 6 students who had failed the Pediatric Nursing achievement test showed a general tendency to place in the lower half of the Pediatric Nursing state board examination range. Of these 6 students, 5 placed below the Pediatric Nursing state board examination mean; however, 1 student placed above this mean.

The coefficient of correlation for achievement test scores and state board examination scores in Pediatric Nursing was plus .52.

Psychiatric Nursing

The distribution of achievement test scores and state board examination scores in Psychiatric Nursing is shown in Table 10. Psychiatric Nursing state board examination scores fell between 375 and 699 with a mean of 562.5.

The 4 students who failed the Psychiatric Nursing achievement tests exhibited a tendency to place below the mean on the Psychiatric Nursing state board examination. Of these 4 students, 3 made scores which fell below the Psychiatric Nursing state board

TABLE 9
PEDIATRIC NURSING STATE BOARD EXAMINATION SCORES DISTRIBUTED BY
PEDIATRIC NURSING ACHIEVEMENT TEST PERCENTILE SCORES

TABLE 10
PSYCHIATRIC NURSING STATE BOARD EXAMINATION SCORES DISTRIBUTED BY PSYCHIATRIC NURSING ACHIEVEMENT TEST PERCENTILE SCORES

examination mean, while the other student's score fell in the same class interval, 550-574, as the mean.

Achievement test scores and state board examination scores in Psychiatric Nursing showed a coefficient of correlation of plus .35.

Summary

The coefficients of correlation for achievement test scores and state board examination scores in the five subject areas ranged from a low of plus .35 in Psychiatric Nursing to a high of plus .63 in Medical Nursing.

State board examination means had a wide range for these five subjects, from 531.8 in Obstetric Nursing to 568.7 in Pediatric Nursing.

In all fields a total of 25 achievement test scores were made that fell below the 40th percentile. Further study indicates that 80 per cent of these individuals who failed to pass an achievement test in a specific subject area, later made a state board examination score, in the same subject area, which fell below the mean for that examination. It can be said then, that there was a tendency for a failure in an achievement test in a specific subject area to be reflected by a grade below the mean on the state board examination in that same area.

The purpose of this chapter has been to discuss the relationship of achievement test scores and state board examination scores of all students in three graduating classes in the selected school. In Chapter IV, the discussion will concern the relation-

ship of course grades and state board examination scores for
this same specified group.

CHAPTER IV

THE RELATIONSHIP OF COURSE GRADES AND STATE BOARD EXAMINATION SCORES

The discussion in the preceding chapter was concerned with the relationship of achievement test scores and state board examination scores for all students in three graduating classes in the selected school. The purpose of this chapter is to examine the relationship of course grades and state board examination scores for this same specified group of students.

Coefficients of correlation for course grades and state board examination scores were calculated for the five subject areas: Medical Nursing; Surgical Nursing; Obstetric Nursing; Pediatric Nursing; and Psychiatric Nursing.

The distributions of the ten variables in the five subject areas are shown in Tables 11, 12, 13, 14, and 15. These tables were constructed with the same range, that is, with the same maximum and minimum scores or grades. This was done so that the various distributions might be more easily compared.

Distribution of course grades and the median course grade for each subject area were discussed in Chapter II. Therefore, since the same course grades were used to determine relationships with both achievement test scores and state board examination scores, it does not seem imperative to repeat all of this informa-

tion. This decision would also apply to the state board examination scores, since the range and mean for each of these examinations were discussed in Chapter III. However, any discussion of the relationship of course grades and state board examination scores must of necessity include portions of this previously discussed material.

Medical Nursing

General Medical and Surgical Nursing course grades and Medical Nursing state board examination scores, Table 11, showed a correlation coefficient of plus .58. The student who made the highest score on the Medical Nursing state board examination had received a General Medical and Surgical course grade of B+. The 2 next highest Medical Nursing state board examination scores were made by individuals with widely different course grades, A- and C+.

Although the 2 lowest Medical Nusing state board examination scores were made by students who had received course grades of C+, the other scores which fell below the Medical Nursing state board examination mean, 562.8, were made by individuals with course grades which ranged from A- through C.

Surgical Nursing

General Medical and Surgical Nursing course grades and Surgical Nursing state board examination scores, Table 12, showed a correlation coefficient of plus .62.

TABLE 11

**GENERAL MEDICAL AND SURGICAL NURSING COURSE GRADES
DISTRIBUTED BY MEDICAL NURSING STATE BOARD
EXAMINATION SCORES**

State Board Examination Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total	98	2	9	13	21	22	27	4	
775 through 799	1			1					
750 through 774									
725 through 749									
700 through 724	2		1					1	
675 through 699	4		2	1					
650 through 674	5	1	1	1	1	1			
625 through 649	9	1	4		2	1	1		
600 through 624	9			5		3	1		
575 through 599	11			1	4	5	1		
550 through 574	11			1	5	4	1		
525 through 549	14		1	1	5	3	3	1	
500 through 524	11			1	1	2	6	1	
475 through 499	10			1	3	1	5	1	
450 through 474	5					1	3		
425 through 449	4					1	3		
400 through 424	2						2		
375 through 399									

Grades and scores in the Surgical Nursing area followed the same pattern as Medical Nursing, in that the students who placed below the Surgical Nursing state board examination mean, had General Medical and Surgical Nursing course grades which ranged from A- through C. However, the 7 highest Surgical Nursing state board examination scores were made by students who also had high course grades (A, A-, and B+), and the 6 lowest Surgical Nursing state board examination scores were made by students who

had low course grades (C+ and C).

TABLE 12

GENERAL MEDICAL AND SURGICAL NURSING COURSE GRADES
DISTRIBUTED BY SURGICAL NURSING STATE BOARD
EXAMINATION SCORES

State Board Examination Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total . . .	98	2	9	13	21	22	27	4	
775 through 799									
750 through 774	1		1						
725 through 749									
700 through 724									
675 through 699	2	1		1					
650 through 674	4		2	2					
625 through 649	9	1	3	1					
600 through 624	8		1	1	4	1		1	
575 through 599	18	1	1	3	5	3	5		
550 through 574	12		2	2	5	4	1		
525 through 549	16		1	2	1	5	6	1	
500 through 524	11				1	3	5	2	
475 through 499	6				2	2	2		
450 through 474	5			1	1	1	2		
425 through 449	4						3		
400 through 424	1						1		
375 through 399	1						1		

Obstetric Nursing

The relationship of Obstetric Nursing course grades and state board examination scores is indicated by the distribution as presented in Table 13, and also by the coefficient of correlation of plus .22.

The Obstetric Nursing state board examination scores of the students who had received Obstetric Nursing course grades of

A, were distributed over a range that covered 9 of the 11 classification intervals. Students who had made course grades of A- followed this same pattern, but even to a greater degree, since the state board examination scores of these students were distributed over 10 of the 11 class intervals.

TABLE 13

**OBSTETRIC NURSING COURSE GRADES DISTRIBUTED BY OBSTETRIC
NURSING STATE BOARD EXAMINATION SCORES**

State Board Examination Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total . .	98	28	29	18	14	6	3		
775 through 799									
750 through 774									
725 through 749									
700 through 724									
675 through 699									
650 through 674									
625 through 649	5	3	2						
600 through 624	11	3	4	2	2				
575 through 599	12	3	2	4	3				
550 through 574	17	6	5	3	2	1			
525 through 549	9	4	3	1					
500 through 524	13	3	3	3	1	1	2		
475 through 499	9	2	2	2	2	1			
450 through 474	10	2	4	2	1	1			
425 through 449	6	2	2	1	1				
400 through 424	4		2		2	1	1		
375 through 399	2								

Pediatric Nursing

The relationship of Pediatric Nursing course grades and Pediatric Nursing state board examination scores is illustrated in Table 14.

TABLE 14

PEDIATRIC NURSING COURSE GRADES DISTRIBUTED BY PEDIATRIC
NURSING STATE BOARD EXAMINATION SCORES

State Board Examination Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total . .	98	2	9	19	28	19	14	7	
775 through 799	1	1							
750 through 774									
725 through 749									
700 through 724	2	1	1						
675 through 699	1				1				
650 through 674	4		2						
625 through 649	13		1	5	5	2			
600 through 584	15		1	5	4	3			
575 through 599	13		2	2	5	1	3		
550 through 574	15		2	3	6	2	1	1	
525 through 549	17			1	6	5	4	1	
500 through 524	4				1	1	2		
475 through 499	6			1		2	1	2	
450 through 474	4					2		2	
425 through 449	4					1	2	1	
400 through 424									
375 through 399	1						1		

All of the students with a Pediatric Nursing course grade of A placed well above the Pediatric Nursing state board examination mean, 568.7, and 7 of the 9 individuals who had a course grade of A- placed above the mean. Of the 21 students who had received course grades of C or C+, all but 5 placed below the state board examination mean.

The calculated coefficient of correlation for Pediatric Nursing course grades and state board examination scores was plus .92.

Psychiatric Nursing

Table 15 shows the distribution of course grades and state board examination scores in Psychiatric Nursing. It is of interest to note that the 18 top Psychiatric Nursing state board examination scores were made by individuals who had received Psychiatric Nursing course grades ranging from B+ through C.

TABLE 15

PSYCHIATRIC NURSING COURSE GRADES DISTRIBUTED BY PSYCHIATRIC NURSING STATE BOARD EXAMINATION SCORES

State Board Examination Scores	Course Grades								
	Number of Students in Each Interval								
	Total	A	A-	B+	B	B-	C+	C	C-
Total . . .	98	3	12	14	24	14	14	13	4
775 through 799									
750 through 774									
725 through 749									
700 through 724									
675 through 699	5			1	2	2			
650 through 674	4				2	1			
625 through 649	9			4	3	1	1		
600 through 624	12	2		2	3	4	1		
575 through 599	12		2	2	4		2	2	
550 through 574	16	1	5	1	3	2	2	1	1
525 through 549	11		1		2	2	3	3	
500 through 524	14		3	2	2	1	3	2	1
475 through 499	7			1	3		1	2	
450 through 474	3		1	1				1	1
425 through 449	2					1		1	
400 through 424	2							1	
375 through 399	1						1		

Students with A and A- course grades made state board examination scores which were distributed over 7 of the 13 class intervals,

that is, covering a range of 175 points. The Psychiatric Nursing state board examination scores of the students with the lowest course grades, C and C-, covered an even wider range of 275 points.

The coefficient of correlation for Psychiatric Nursing course grades and state board examination scores was plus .26.

Summary

The coefficients of correlation for the five subject areas, Medical Nursing, Surgical Nursing, Obstetric Nursing, Pediatric Nursing, and Psychiatric Nursing ranged from a low of plus .22 in Obstetric Nursing to a high of plus .92 in Pediatric Nursing. The state board examination means ranged from 531.8 in Obstetric Nursing to 568.7 in Pediatric Nursing. It is interesting to note that the subject area with the highest coefficient of correlation, Pediatric Nursing, also had the highest state board examination mean. The subject area with the lowest coefficient of correlation, Obstetric Nursing, had the lowest state board examination mean. The significance of this is uncertain since the state board examination means and correlation coefficients in the other three areas did not follow this same pattern.

The relationship of course grades and state board examination scores for all students in three graduating classes in the selected school has been presented and analyzed in this chapter. Chapter V will be concerned with a discussion of the interrelationship of achievement test scores, course grades, and state board examination scores for these students.

CHAPTER V

THE INTERRELATIONSHIP OF ACHIEVEMENT TEST SCORES, COURSE GRADES, AND STATE BOARD EXAMINATION SCORES

In each of the preceding chapters the relationship between two variables has been discussed. Chapter II examined the relationship of achievement test scores and course grades; Chapter III, achievement test scores and state board examination scores; and Chapter IV, course grades and state board examination scores.

The purpose of this chapter is to analyze the mutual relationship of these three specific evaluation devices; that is, to analyze the interrelationship of achievement test scores, course grades, and state board examination scores.

In order to enhance the visualization of the mathematical interrelationship, the coefficients of correlation for the five subject areas are presented in Table 16.

The discussion which follows dwells, for the most part, on the constancy of the interrelationship within each separate subject area.

Medical and Surgical Nursing

The interrelationship of achievement test scores, course grades, and state board examination scores in both Medical and

TABLE 16
CORRELATION COEFFICIENTS DISTRIBUTED BY
RELATIONSHIP AND SUBJECT AREAS

Relationship Area	Subject Areas			
	Medical Nursing	Surgical Nursing	Obstetric Nursing	Pediatric Nursing
Achievement test scores and course grades	.59	.57	.25	.34
Achievement test scores and state board examination scores	.63	.58	.42	.41
Course grades and state board examination scores	.58	.62	.22	.92

Surgical Nursing is of a constant nature. This mutual connection is constant in each of the six relationship areas in Medical and Surgical Nursing, with plus .57 as the lowest correlation coefficient, and plus .63 as the highest.

Obstetric Nursing

The interrelationship of Obstetric Nursing achievement test scores, course grades, and state board examination scores is not constant. The achievement test-course grade and course grade-state board examination relationships are similar, being plus .25 and plus .22. The achievement test-state board examination relationship, however, is plus .42.

Pediatric Nursing

Interrelationship in Pediatric Nursing follows a rather peculiar pattern, varying from a low of plus .38 for achievement test scores and course grades, to plus .52 for achievement test scores and state board examination scores, and then to a high of plus .92 for course grades and state board examination scores. The interrelationship in the Pediatric Nursing area is not uniform.

Psychiatric Nursing

Psychiatric Nursing achievement test scores, course grades, and state board examination scores present a still different picture in interrelationship. The interrelationship is variable but does not present the extreme pattern of variability as does the previously discussed area. The relationships in Psychi-

atric Nursing range from a low of plus .26 to a high of plus .41.

All Areas

Examination of the five areas for the purpose of comparing interrelationship in one area with that present in another area, reveals several important factors. The interrelationships present in Medical Nursing and Surgical Nursing are the most constant of any of the subject areas. The interrelationships in Obstetric, Pediatric, and Psychiatric Nursing are all variable, with the interrelationship in the Pediatric Nursing area presenting the most extreme variability.

Further consideration of the coefficients of correlation, Table 16, reveals that of the three relationships studied for the five subject areas, the most constant relationship is that of achievement test scores and state board examination scores.

The purpose of this chapter has been to examine the interrelationship of achievement test scores, course grades, and state board examination scores for the selected school.

The following chapter, which is the sixth and final chapter, will be concerned with a discussion of the implications evidenced by the findings of this study--implications for the selected school and implications for the nursing profession.

CHAPTER VI

IMPLICATIONS OF THE STUDY

The stated purpose of this study was to determine the interrelationship of achievement test scores, course grades, and state board examination scores in a selected school of nursing. The determined relationships and interrelationships have been explored in the four preceding chapters.

The purpose of this chapter is to indicate the implications of these findings.

The continuous evaluation of student progress in a school of nursing has two facets. One is the periodic measurement of student achievement in terms of the objectives of the school's educational program. This measurement must determine for the school to what extent the student, at a particular stage of her progress, has acquired the knowledge, skills, and understanding that the faculty has been trying to help her develop.

The other facet of the evaluation process, checks the school's objectives against the requirements of the type of nursing practice for which the student is being prepared. This measurement must determine whether the abilities which the school is trying to develop are in accord with those expected of a beginning graduate nurse.¹

¹The Use of Tests in Schools of Nursing: The NLN Achievement Tests in Professional Nursing, pp. 2 and 37.

The findings of this study indicate a need for the faculty of the selected school to investigate the course objectives in the first-mentioned evaluation activity. The interrelationship of scores and grades were analyzed in five subject areas, and a constant interrelationship was determined in only two of the five areas. A thorough examination and appraisement of teacher-made course objectives would seem to be indicated. Further support for this conclusion is furnished by the other major finding of the study. Three relationship areas were studied: achievement test-course grade; achievement test-state board examination; and course grade-state board examination. The relationship between achievement test scores and state board examination scores was the most constant of these three relationship areas.

The implications of this study for the selected school of nursing are twofold: there are needed a thorough examination of the curriculum in the school itself, and in the affiliating institutions, in relation to course objectives and content and teaching, testing, and grading methods; and, an evaluation of the existing guidance program--for the factors which produce individual achievement test failure can best be altered through proper student guidance.

In the field of nursing education, the implications of this study are many and varied. Similar studies should be done in a number of nursing schools, and the results of these studies compared. A nationwide investigation of the relationship of

achievement test scores and state board examination scores might well be sponsored by the National League for Nursing. Since the factor of clinical performance has been omitted in this project, a valuable study could be done on the relationship of clinical success to achievement test and state board examination scores.

Obstetric Nursing has proved to be a problem area in this study. Further investigation is needed to determine if it is problematic in the selected school alone. The trend of graduate nurses away from the field of Obstetrics, indicates the need for additional research.

Lastly, the psychological factors which influence failure and success on achievement test and state board examinations merit intensive investigation.

The purpose of this chapter has been to indicate the implications of these findings for the selected school and for the nursing profession.

APPENDIX

EXAMPLE OF THE CALCULATION OF THE COEFFICIENT OF CORRELATION

The Relationship of General Medical and Surgical Nursing Course
Grades and Surgical Nursing Achievement Test Scores

N : 98

X : course grades

Y : achievement test scores

ΣX : 276.25

Mean of X : 2.81

ΣY : 7557

Mean of Y : 77.11

x : deviations from the mean of X

y : deviations from the mean of Y

x^2 : 24.2303 or 24.23

y^2 : 33176.7558 or 33176.76

xy : +577.9325
- 65.1784
512.7541

Formula

$$r: \frac{\sum xy}{\sqrt{\sum x^2} \cdot \sqrt{\sum y^2}}$$

$$r: \frac{512.7541}{803872.8948}$$

$$r: 5718 \text{ or } .57$$

$$r: \frac{512.7541}{\sqrt{24.23} \cdot \sqrt{33176.76}}$$

$$r: \frac{512.7541}{896.58}$$

TABLE A

**MEAN ACHIEVEMENT TEST AND STATE BOARD
EXAMINATION SCORES, AND MEDIAN
COURSE GRADES BY SUBJECT AREA**

Subject Area	Mean Achievement Test Score	Median Course Grade	Mean State Board Examination Score
Medical Nursing	78.4	B-	562.8
Surgical Nursing	77.1	B-	556.3
Obstetric Nursing	73.6	A-	531.8
Pediatric Nursing	78.1	B	568.7
Psychiatric Nursing	79.3	B	562.5

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